L Number	Hits	Search Text	DB	Time stamp
1	65	(ionized adj physical adj vapor) and @ad<20020123 and (Ti or titanium)	USPAT; US-PGPUB	2003/09/23 13:16
2	18	(ionized adj physical adj vapor) and @ad<20020123 and AC	USPAT; US-PGPUB	2003/09/23 13:22
3	16	((ionized adj physical adj vapor) and @ad<20020123 and (Ti or titanium)) and ((ionized adj physical adj vapor) and @ad<20020123 and AC)	USPAT; US-PGPUB	2003/09/23 13:16
4	1	(ionized adj physical adj vapor) and @ad<20020123 and AC	EPO; JPO; DERWENT; IBM TDB	2003/09/23 13:22

L Number	Hits	Search Text	DB	Time stamp
1	121	ionized adj physical adj vapor	USPAT; US-PGPUB	2003/09/23 11:43
2	107	(ionized adj physical adj vapor) and @ad<20020123	USPAT; US-PGPUB	2003/09/23 11:43
3	65	((ionized adj physical adj vapor) and @ad<20020123) and (Ti or titanium)	USPAT; US-PGPUB	2003/09/23 11:44
4	63	(((ionized adj physical adj vapor) and @ad<20020123) and (Ti or titanium)) not (fortin or mosel)	USPAT; US-PGPUB	2003/09/23 11:54
5	15	((((ionized adj physical adj vapor) and @ad<20020123) and (Ti or titanium)) not (fortin or mosel)) and silicide	USPAT; US-PGPUB	2003/09/23 11:48
6	6	(((((ionized adj physical adj vapor) and @ad<20020123) and (Ti or titanium)) not (fortin or mosel)) and silicide) and cobalt	USPAT; US-PGPUB	2003/09/23 11:50
7	9	(((((ionized adj physical adj vapor) and @ad<20020123) and (Ti or titanium)) not (fortin or mosel)) and silicide) not ((((((ionized adj physical adj vapor) and @ad<20020123) and (Ti or titanium)) not (fortin or mosel)) and silicide) and cobalt)	USPAT; US-PGPUB	2003/09/23 11:50
8	48	((((ionized adj physical adj vapor) and @ad<20020123) and (Ti or titanium)) not (fortin or mosel)) not (((((ionized adj physical adj vapor) and @ad<20020123) and (Ti or titanium)) not (fortin or mosel)) and silicide)	USPAT; US-PGPUB	2003/09/23 11:54

DOCUMENT-IDENTIFIER: US 20020001946 A1

TITLE: Method and fabricating metal interconnection with reliability using ionized physical vapor deposition

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Detail Description Paragraph - DETX (3):
[0020] First, referring to FIG. 3, a first Ti film 22 is formed on a semiconductor substrate 21 at a thickness of approximately 50 to 500 .ANG. using the ionized physical vapor deposition (referred to as "IPVD") method. In the sputtering method, metal atoms from a target may be ionized and accelerated toward a wafer through **AC** bias which is applied to a semiconductor substrate. The directness of the ionized atoms may provide an improved step-coverage of the first Ti film 22. In the IPVD method using a radio frequency coil, a hollow cathode or a magnetron, since the kinetic energy of the ionized Ti atoms is high, the first Ti film 22 has an excellent crystal orientation in an <002> direction. Further, in the preferred embodiment of the present invention, the **AC** bias is in a range of 0 to 500 W and the DC bias is applied to the radio frequency coil in a range of 0.5 to 5 kW when the processing pressure is in a range of approximately 1 to 100 mtor.

Claims Text - CLTX (3):
2. The method as recited in claim 1, wherein the ionized physical vapor deposition method uses any one of a radio frequency coil, a hollow cathode and a magnetron and applies **AC** bias to a processing chamber in order to increase a

directness of the ionized atoms from a Ti target.

Claims Text - CLTX (5):
4. The method as recited in claim 3, wherein an **AC** bias of 0 to 500 W is applied to a wafer, on which the multilayer metal thin film is formed, at a pressure of 1 to 100 mtorr and a DC bias of 0.5 to 5 kW is applied to the radio frequency coil.

Claims Text - CLTX (15):
14. The method as recited in claim 10, wherein the ionized physical vapor deposition method uses any one of a radio frequency coil, a hollow cathode and a magnetron and applies **AC** bias of 0 to 500 W to a processing chamber.

Claims Text - CLTX (17):
16. The method as recited in claim 15, wherein an **AC** bias of 0 to 500 W is applied to a wafer, on which the multilayer metal thin film is formed, at a pressure of 1 to 100 mtorr and a DC bias of 0.5 to 5 kW is applied to the radio frequency coil.